

Appl. No. 09/992,558
Amdt. dated December 23, 2004
Reply to Office action of September 23, 2004

REMARKS/ARGUMENTS

This Amendment is intended to be a complete response to the Office Action of September 23, 2004 and the application is believed to be in condition for allowance. Accordingly, reconsideration is respectfully requested.

Status of the Claims

Claims 1-79 are pending in the application. Claims 1-79 were rejected in the Office Action.

The Drawings

The Examiner has indicated that Figures 1-3 should be designated with a legend such as --Prior Art--. Applicants acquiesce to the suggested change. However, Applicants would like to defer providing the corrected drawings until after allowable subject matter has been indicated.

The Examiner further indicated that element 510 of Figure 5 is unreadable and that the drawing therefore must be replaced. Applicants agree with the proposed change. However, Applicants would like to defer providing the corrected drawings after allowable subject matter has been indicated.

The Specification

The Examiner observed that the trademark "Java Card" has been used in the application. Applicants have amended the specification to capitalize Java Card and to use the generic terminology. Applicants have only found one paragraph to require the change. If the Examiner is of the opinion that other parts of the application require a similar change, Applicants are prepared to consider such changes.

The Claims

35 USC 112, first paragraph

Claims 4, 10, 19, 25, 32, 38, 48, 55, 66, and 73 were rejected under 35 USC 112, first paragraph as failing to comply with the enablement requirement. In particular, the Examiner stated that the specification lacks a description of the step of resolving. Applicants respectfully traverse the rejection.

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Claim 4 recites "resolving each unresolved reference in each instruction of the at least one method body starting with the first instruction of the at least one method body and ending with the instruction corresponding to the FLR Pointer." The inventors make no claim to "resolving" in isolation, but only in the context of the other limitations of this claim specifically recited in this claim and limitations inherited from the base claim and any intervening claims. The point is not *how* to resolve, but *what* to resolve.

Resolving references is well known in the art. In fact, the Java Card Specification specifies how references are to be resolved. Furthermore, the specification on Page 3 describes the process of resolving references:

The process of resolving these particular operands is generally referred to as linking or resolution and involves looking-up the symbolic reference in a corresponding table present in memory (constant pool) or other storage device or calculating the unresolved relative code reference and replacing the reference with the actual memory address or an internally accessible symbolic reference at which the particular command, function, definition, etc. is stored. The terms "resolve," "resolution," "resolving," and "linking" are used throughout to broadly describe the foregoing process of replacing the unresolved code or symbolic reference within the code or data structure with an internally accessible symbolic reference or actual memory address. (Specification, Page 3, Lines 1-10).

Accordingly, no further explanation of resolving references would be necessary to enable a person of ordinary skill in the art to practice the invention. Therefore, Applicants respectfully request withdrawal of the rejection of these claims under 35 USC 112, first paragraph.

35 USC 112, second paragraph.

Claims 1-43 and 62-79 were rejected under 35 USC 112, second paragraph. In particular, the Examiner noted that the acronym FLR should be spelled out to avoid confusion. Applicants have amended Claims 1, 16, 29, 62, and 77 to indicate that

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"FLR" stands for "Farthest Logical Return" as suggested by the Examiner.
Accordingly, Applicants respectfully request withdrawal of the rejection.

35 USC 103(a)

Claims 1-3, 16-18, 44-47, and 62-65 were rejected under 35 USC 103(a) as unpatentable over Lance in view of Lai (Applicants adopt the Examiners short-hand form for all references discussed herein). Claims 4-6, 19-21, 48-50, and 66-68 were rejected under 35 USC 103(a) as unpatentable over Lance and Lai in view of Baentsch. Claims 7-9, 15, 22-24, 51-54, 61, and 69-72 were rejected as unpatentable over Lance and Lai in view of JCVMS 2.1. Claim 14 was rejected as unpatentable over Lance and Lai in view of JCVMS 2.1.1. Claims 10-12, 25-27, 55-57, and 73-75 were rejected as unpatentable over Lance, Lai and JCVMS in view of Baentsch. Claims 13, 28, 58, and 76 were rejected under 35 USC 103(a) as unpatentable over Lance, Lai, JCVMS 2.1 in view of JCVMS 2.1.1 and Lindholm. Claims 29-31, 59, and 77 were rejected under 35 USC 103(a) as unpatentable over Lance, Lai, in view of Chen. Claims 32-34 were rejected under 35 USC 103(a) as unpatentable over Lance, Lai, Chen in view of Baentsch. Claims 38-40 were rejected under 35 USC 103(a) as unpatentable over Lance, Lai, Chen and JCVMS 2.1 in view of Baentsch. Claim 41 was rejected under 35 USC 103(a) as unpatentable over Lance, Lai, Chen and JCVMS 2.1 in view of Lindholm. And finally, Claims 42, 60, 78 were rejected under 35 USC 103(a) as unpatentable over Lance, Lai, Chen in view of JCVMS 2.1.1. Applicants traverse these rejections.

To summarize the obviousness rejections: The independent claims 1, 16, 62 were rejected as unpatentable over Lance in view of Lai and the independent claims 29, 59, and 77 were rejected as unpatentable over Lance and Lai in view of Chen. With respect to Claims 29, 59 and 77 the Examiner states "All further limitations have been addressed in the above rejection of Claim 1" (Office Action, Paragraph 19). Thus, the issue of patentability with respect to 35 USC 103(a) may therefore be limited to the discussion on whether the independent claims recite combinations of elements that are not taught or suggested by Lance and Lai.

Applicants have invented a novel and non-obvious invention "for determining instruction boundaries in at least one method body" (Claim 1). The claimed invention

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“examin[es] each instruction ... of the ... method body for a [forward jump or valid ending instruction]” while “maintaining a FLR Pointer [to the farthest *detected* forward jump or ending instruction]” and “terminating [that process] when the instruction under examination is beyond the instruction corresponding to the FLR Pointer” (Claim 1).

Lance does indeed examine for branch and ending instructions. However, the issue is not whether there is an examination for branch or ending instructions, but rather the issue is what one does with the detected branch or ending instructions. In the case of Lance, branch and ending instructions are used to break the code into basic blocks for the purpose of analyzing the code. Lance builds on Aho, Sethi and Ullman’s algorithm for determining basic blocks. Presumably Aho, Sethi and Ullman also examined the code for branch and ending instructions. Applicants are willing to concede that code analysis programs have a need for detecting branch and ending instructions. However, that does not result in the conclusion that such code analysis programs (like Lance’s) use the detected branch and ending instructions to determine an instruction boundary for a method boundary.

The Examiner has made the erroneous conclusion that Lance teaches “terminating the examining for a forward jump or a valid ending instruction when the instruction under consideration is beyond the instruction corresponding to the FLR pointer” when Lance teaches in Section 3.2, Paragraph 3 that “After identifying leaders, our algorithm partitions the code into basic blocks. A basic block is defined as consisting of the leader instruction and all instructions up to but not including the next leader instruction.” That is a manifestly incorrect conclusion. Applicants have made the observation that by maintaining an FLR pointer as set forth in the claim, it is possible to know when to terminate the examination of instructions for additional forward jump and valid return instructions. A “leader”, according to Lance, is the instruction which is either the first instruction, the target of a branch instruction, or an instruction that follows a branch instruction. In other words, a “leader” is the first instruction of a basic block. Thus, after having identified the “leaders” it is possible to partition into basic blocks. But that does not teach anything about where you terminate searching for leaders, and it does not teach anything about where you terminate searching for forward jump or valid end instructions.

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The Examiner has noted that "Lance does not expressly disclose *b) maintaining a FLR ("Farthest Logical Return") Pointer corresponding to the instruction of the at least one method body for which the farthest forward jump instruction or the farthest valid ending instruction is detected*" (Office Action, Paragraph 13 on Page 6). The Examiner has pointed to Lai for that missing element from Lance. However, Lai also does not teach or suggest "*maintaining a FLR ("Farthest Logical Return") Pointer corresponding to the instruction of the at least one method body for which the farthest forward jump instruction or the farthest valid ending instruction is detected.*" The Examiner cited a passage (Lai, Col. 7, Lines 5-11) as disclosing this element. However, as noted above that passage, the "size of an object is specified in encoded fields (50) of the object table entry (OTE)" (Lai, Col. 7, Lines 4-5). This is in fact teaching away from the invention. The equivalent to the *object size* field of Lai would be having a size field in the method body that indicated where the method body ended. However, because there is no such size field in a method body, it is necessary to devise other approaches to determine where to end examination for references to be resolved. The prior art discussed in the Specification uses relocation annotations. The Baentsch reference (used in the rejection of Claims 4 and several other claims) discusses the use of a fixup table for that purpose. Applicants have invented an approach for determining the instruction boundary without a size indicator (a size indicator being what one might have arrived at by trying to apply the teaching of Lai to the problem at hand) and without relocation annotations or fixup tables. Thus, Lai's object size field is not equivalent to maintaining the FLR as set forth in Claim 1.

Lai is silent on how the object size field is populated. Considering that Lai does not teach or suggest any type of analysis of computer code, e.g., linking, loading, resolving, code analysis, compiling, it is not surprising that Lai does not teach or suggest determining the boundary for the object which could be used to set the object size field by examining for forward jump instructions and valid ending instructions and maintaining a pointer to the farthest detected such instruction.

Accordingly, for the foregoing reasons the combination of Lance and Lai does not teach or suggest the invention claimed in Claim 1. Therefore, Claim 1 must be allowed.

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None of the other cited references teaches or suggests anything to overcome the lacking elements of Lance and Lai. Therefore Claim 1 is patentable over each such reference and any combination of Lance, Lai, and the various other references. For the sake of brevity, as the above argument provides a complete response to the Examiner's rejection under 35 USC 103(b), Applicants defer arguing patentability with respect to the other references but reserve the right to do so in the future should the occasion arise.

All the independent claims recite similar limitations to those set forth in Claim 1. Accordingly, the other independent claims are also patentable over Lance and Lai, taken singly or in combination, and should therefore be allowed.

The dependent claims incorporate all the limitations of their respective base claims, provide further unique and non-obvious combinations and are patentable over Lance and Lai for the reasons given in support of their respective base claims and by virtue of such further combinations.

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CONCLUSION

It is submitted that all of the claims now in the application are allowable. Applicants respectfully request reconsideration of the application and claims and its early allowance. If the Examiner believes that the prosecution of the application would be facilitated by a telephonic interview, Applicants invite the Examiner to contact the undersigned at the number given below.

No fees are believed to be due in connection with this Response.

Applicants respectfully request that a timely Notice of Allowance be issued in this application.

Respectfully submitted,



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Enclosures:

1. Transmittal Form (1 page)

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